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Integrating Business Opportunities in Contiguous Economies: A Note on the Low-Cost Manufacturing Enclaves in Batam Island, Indonesia

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INTEGRATING BUSINESS OPPORTUNITIES IN CONTIGUOUS ECONOMIES: A NOTE ON THE LOW-COST MANUFACTURING ENCLAVES IN BATAM ISLAND, INDONESIA[1]

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ABSTRACT

In the 1990s, Singapore established several industrial parks in Asia to capitalize on the rising demand for low-cost manufacturing centers. These parks were envisioned as attractive investment enclaves, boasting a combination of location-specific advantages and world-class infrastructure, further complemented by Singapore's ability to negotiate investment concessions at an inter-government level. Since the establishment of Singapore's Batamindo Industrial Park (BIP) in Riau, Indonesia, similar sites offering more competitive cost structures have emerged. The mushrooming of industrial parks is seen as an indication of Batam attractiveness as an investment location, reflecting the (Singapore) government's long-term vision of twinning the contiguous Singapore-Riau economies. This paper considers the success of BIP vis-à-vis two non-Singaporean competitor parks, Panbil Industrial Estate (PIE) and Tunas Industrial Estate (TIE). Evidence from on-site surveys and interviews are presented. This paper concludes that BIP must contend with rising competition from the newer industrial developments, despite retaining certain first-mover advantages.

INTRODUCTION

Within 40 years of its independence, Singapore has established an excellent reputation as a worldwide leading trans-shipment hub as well as a premier location for regional headquarters. Singapore's corrupt-free government, superior infrastructure and efficient workforce, coupled with the reliability of its legal and financial systems, provided an important platform that allowed the country's economic agencies to attract numerous foreign direct investments into the city-state [8][14]. However, by the mid-1980s, rising domestic business costs and greater competition in the region (notably from Malaysia and Indonesia) were eroding its competitiveness as a low-cost manufacturing location, highlighting the need for Singapore to steer its policies towards generating high economic 'value-added' activities as well as to expand economically beyond its territory.

The Singapore government duly responded; introducing an overseas investment program in 1988 that sought to encourage Singapore-based firms to enter into joint ventures and partnerships with foreign firms, especially those in Europe and North America, in hope of gaining access foreign markets and their latest technologies [2]. However, instead of achieving its objectives, many of the investments resulted in massive financial losses even before the early 1990s [5]. Necessity for strategy reformulation was evident; and the Singapore government re-aligned its strategy to focus on growth within Asia, justified by the immense potential of developing Asian economies (China,

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Indonesia and Vietnam) that are experiencing exponential growth rates following the relaxation in foreign investment controls. [10].

The principal drive of the regionalization program was to transplant the proven Singapore industrial townships model into the region, simulating a `Singapore-styled' business environment in emerging economies. The aim of the regionalization drive was to create economic space for local and Singapore-based companies, enabling resource-dependent operations to be moved into the region and restructuring their operations in Singapore to focus on higher-end activities, thereby leveraging on the distinctive advantages offered by each location.

This paper revisits the discussion on the success of Singapore's first overseas industrial township project - Batamindo Industrial Park (Batam Island, Indonesia), as an investment enclave, vis-à-vis its 2 main competitors - PIE and TIE. To provide context to the discussion, the theoretical considerations underpinning the flagship Batamindo Industrial Park projects are sketched in the next section, followed by an account of the origins and progress of the case study parks. The analysis is reinforced by empirical data from our on-site surveys of the Parks' tenants. The final section considers the implications of the new evidence on Singapore's broader regionalization program, and evaluates the city-state's efforts to harness synergistic complementarities with contiguous areas in its strategic intent to restructure the Singapore economy.

THEORETICAL CONSIDERATIONS

Several theories have been expounded on the economic integration of regions to spearhead economic growth and development. Perroux [11] postulated the concept of growth poles. In essence, this concept projects the notion of an economic space as a field of forces consisting of a nucleus from which centrifugal forces emanate and centripetal forces are attracted. Bouderville [1], extending Perroux's concept, has defined a regional growth pole as a set of expanding industries located in an urban area inducing further developments of economic activity through its zone of influence. Hermansen [3] added the thesis that inter-industry, multiplier and accelerator linkages play a major role in the development of growth poles and growth centers. Cost reductions through productivity gains, innovations and scale economies are viewed as providing the opportunities for propulsive industries to initiate growth, and to pass growth impulses through the linkage chains. The discourse on growth poles has been extended, in more recent literature, to deliberations on the presence of immobile clusters of complementary value-added activities [6].The transactional benefits of spatial proximity (surveyed in [2]) and, in the context of this paper, on notions of growth zones, `defined' as the spread from the early nuclei of economic activities to territories adjacent, or in close proximity, to longer established nuclei of industrial growth. In the 1990s, set in the context of the globalization of economic activities, the phenomenon took on cross-border dimensions with the promulgation of regional economic zones [13].

Location theories and, in particular, the agglomeration aspects suggest that there are scale economies to be derived through certain types of industries, or industrial clusters within a region, namely, internal economies, localization economies, and external economies [7]. The agglomeration aspects, as applied to the Singapore-Riau `alliance', include localization economies, urbanization economies, standardization economies and network externalities. Rationalization theories suggest that firms should redistribute their operations in different location to capitalize on the comparative advantages offered in each location. These theories argue that the production process should be viewed as a value chain, and firms should identify the comparative or location-specific advantages unique to each country/territory, and the competitive or firm-specific advantages unique to the firm/core functions, and then incorporate these advantages into the value chain [12]. In this respect, Batam, given the close proximity to Singapore, fits in strategically.

The strategic thrust of the flagship projects was to get investors to look at Singapore and the Riau islands, which are at different stages of development, as a single investment region, and not as separate states competing for investments. The flagship projects presented investors with a packaged choice to locate the activities along their value chains in the contiguous areas to support "the whole range of business requirements" within a single region. Singapore, for instance, can support business operations dependent on advanced technology and sophisticated services, while low value, labor-intensive industries can be located in Riau. Specialization in this way is designed to attract investment by enabling investors to retain activities in close proximity while making use of contrasting environments i.e.

complementary specialization in national border territories. In the process, these firms, with their various activities located in close proximity, also reap the economies of agglomeration suggested by location theories.

THE INDONESIAN PARKS

BATAMINDO INDUSTRIAL PARK (BIP)

Indonesia's program to develop the Riau islands dates back to the late 1960s when Batam was identified as a potential logistics and operational base to support offshore oil and gas fields. The development plan was subsequently reviewed in 1979, with the Batam Industrial Development Authority (BIDA) opting to focus on the development of transhipment facilities, the establishment of industrial estates, the development of marshalling areas for imports and exports, the construction of tourist facilities and the provision of infrastructural support. This master plan was aimed to leverage on the Riau islands close-geographical proximity to address Singapore's land and labor constraints and, more importantly, to take advantage of Singapore's established business and financial services network and the city-state's efficient facilities for communication, transportation and other services.

BIP was launched in 1992. The Park started as a joint-venture between Singaporean government-linked companies (GLCs) and the Salim Group of Indonesia. At that time, Salim was Indonesia's largest business conglomerate, and had close links to senior politicians and privileged access to the major investment projects in the Riau Islands [4]. Singaporean GLCs were given control over the development and management of the Parks, while Salim's role was to facilitate operations and to leverage on their links to provide a guarantee of priority over regulatory controls and administrative approvals. Singapore's reputation for transparent and efficient management of projects lent further credibility to the projects.

A key aspect of BIP's marketing strategy was to position itself as a self-contained Park with its communication and business linkages through Singapore rather than through Indonesia. BIP, for instance, has its own power supply, water treatment plant, sewerage system, telecommunications facilities and social amenities. The objective was to create an investment enclave that mirror conditions in Singapore, providing the premium Singapore development standards in a low-income economy.

BIP's first tenants were mainly subsidiaries of American, European, and Japanese multinationals already operating in Singapore. Cumulative investments and export value in BIP topped US$1billion and US$2 billion in 2002 respectively, and the number of confirmed tenants increased from 17 in 1991 to 85 in 2004. Of these, 39 were Japanese companies with Singapore-owned companies the next largest concentration at 25. American and European investors accounts for less than 20 percent of the total client base. There is a concentration of electronics operations, mainly various component assembly processes, and supporting activities to the electronics sector such as plastic molding and packaging. Total employment stands at 65,000.

PANBIL INDUSTRIAL ESTATE (PIE)

Panbil was started by PT Nusatama Properata Panbil in conjunction with Panbil Investment Holding Company. PT Nusatama Properata Panbil is a wholly-owned subsidiary of PT. Harapan Jaya Sentosa group which includes established companies in the involved in the planning, development, construction and management of industrial, commercial, and residential properties. PIE is backed by Indonesia's Government Bank, including Bank Mandiri, regarded as the biggest Bank in Indonesia, and local government authorities, investors can expect the best possible assistance and standards.

Located at the centre of Batam Island, Panbil Industrial Estate is a US$150 million development project on 130 hectares of prime land. It is conceived as a state-of-the-art, integrated and self-contained industrial township. Its synergized location, world-class infrastructure and service-support allow investors to tap into Singapore's excellent hub facilities, and Indonesia's competitive operation incentives. PIE has also invested in a range of facilities such as on-site power supply and water treatment facilities, executive housing and worker dormitories, as well as commercial and other social amenities. As well, PIE also provides logistics support, and state-of-the-art telecommunications links.

For investors, PIE offers a range of land parcel, standard factories for immediate start-up, and customized factories. Investors at PIE enjoy a host of incentives which include 100% foreign ownership and other tax concessions comparable to those accorded to BIP's tenants. Currently, there are 8 tenants from Singapore, Malaysia and Tunisia, occupying 14 lots within the estate. PIE is in the first stage of development

TUNAS INDUSTRIAL ESTATE (TIE)

Tunas Industrial Estate, managed by Tritunas Mandiri Co.Ltd, is a smaller industrial park compared to the other two parks. TIE is developed by Rezeki Putra Riau Co.Ltd, which also built and managed Batam's Top 100 Plaza and supermarket chains, houses, warehouses, and factory buildings on the island.

TIE is strategic located near Batam's main seaport, and offers basic infrastructural facilities, including ready-built factories, dormitories, shops and social amenities. TIE has 17 tenants, including 3 companies from Japan, 4 from Singapore and 8 Indonesian companies involved in the production of consumer goods, electronic products and industrial services. Tunas Industrial Estate, like BIP and PIE, was conceived as an all-in-one service provider. Construction of Tunas Industrial Estate commenced in 1999 with the first of the two phases of development being almost completed.

RESEARCH FINDINGS

Prior analyses on the Parks have relied primarily on secondary data from official publications, press reports, etc. To obtain primary data on the differential impact of various pull factors on firms' investment decisions, along with the differential impact of different types of constraints on their operations, we surveyed the tenants in BIP, in July 2003 and BIP's main competitor industrial parks in Batam, including PIE and TIE, in July 2004. The first set of questions sought to determine the profile of the respondents: type of ownership, nature of operations and size of establishment; and the second set was structured to gather information on the push-pull affecting the investment decisions of the tenants. Other questions pertaining to the respondents' views on the facilities and services in the Parks were culled from the open-ended questions. A total of 43 responses were collected from these parks.

Profile of the respondents

There were 25 respondents in the BIP survey, of which 6 were wholly Singapore-owned, 5 were Singaporean joint ventures, and 15 were wholly foreign-owned. The respondents were mainly involved in the manufacturing of intermediate products. 6 of the respondents were involved in the manufacture of consumer products, and another 5 were providers of industrial services. There were 6 respondents with a sales turnovers of less than US$5 million, 13 respondents with turnovers between US$5 million and US$50 million, and the remaining had turnovers exceeding US$50 million.

Of the 18 respondents from other Batam parks, 8 were wholly Singapore-owned, 4 were wholly Indonesian-owned, 4 were wholly foreign-owned and 2 were joint venture. As for the nature of operations, 11 of the respondents were involved in manufacturing of intermediate products, 2 were involved in consumer products while the remaining are involved in industrial and other services. 13 respondents had a sales turnover less than US$5 million and 3 respondents had sales between US$5 million and US$50 million.

Statistical Treatment of Survey Results

Apart from analyzing the descriptive statistics and popular rankings on the responses related to factors and constraints, logit analysis was used to compare the push/pull factors influencing the tenants' decision to locate in the Parks. The logit model, estimated by the maximum likelihood, takes the following form:

$$P_i = \exp(Z_i) / [\, 1 + \exp(Z_i)]$$

where: P_i is the probability of firm being located in the particular park

exp refers to the exponentiation operator, and
Z_i is a linear function of the push/pull factors defined as

$$Z_i = \alpha_0 + \sum_{i=1}^{i=7} \alpha_i F_i$$

where: F_i (1 to n, depending on the type of push/pull factor) = 1 if constraint i is selected, 0 otherwise
α_0 = constant term
αi = coefficient of independent (explanatory) variable

Estimated coefficients in the logit model, if statistically significant (as indicated by the p-values), would suggest that the firm choosing that particular push/pull factor is more likely to be from BIP than from Non-BIP parks. A similar logit model was applied to the constraints faced by the Parks' tenants:

$$P_i = \exp(Z_i) / [\, 1 + \exp(Z_i)]$$

where: P_i is the probability of firm being located in the particular park
exp refers to the exponentiation operator, and
Z_i is a linear function of the constraints defined as

$$Z_i = \beta_0 + \sum_{i=1}^{i=n} \beta_i C_i$$

where: C_i (1 to n, depending on the type of constraint) = 1 if constraint i is selected, 0 otherwise
β_0 = constant term
β_i = coefficient of independent (explanatory) variable

In this case, estimated coefficients in the logit model, if positive and statistically significant, would suggest that the firm choosing that particular constraint is more likely to be from BIP than from competitor parks.

FINDINGS

Factors influencing respondents' decision to invest in BIP/Non-BIP Batam parks (Table 1)

Singapore leverages on its infrastructure development expertise and the low-cost labor available in the host environments to market BIP. BIP supplements these purported advantages with the political commitment from the Singapore government, with the plethora of bilateral agreements between Singapore's GLCs and host governments, or politically-linked business conglomerates. Furthermore, there is a host of investment incentives that entice multinationals to locate their lower value-added activities in BIP, giving it a host of advantage over the competitor parks.

BIP was largely developed by Singapore's government-linked companies, and marketed as Singapore-styled parks with infrastructural facilities, factories and amenities to match. As such, it was no surprise that BIP tenants surveyed ranked reliable infrastructure as the key factor influencing their decision to invest in the park. Considerations over infrastructural facilities also ranked amongst the priorities of the tenants in the competitor parks, but a positive and statistically significant α_4 (=5.019) suggested that this was a more significant factor for BIP tenants than those in the competitor parks. It is plausible that BIP tenants, who paid premium rates for the premium Singapore-styled infrastructure, were more inclined to emphasize this factor. On the other hand, the tenants in the competitor parks were more prepared to strike a compromise between reliable infrastructure and lower overhead costs, and were less likely to place as much emphasis on this factor.

Correspondingly, competitive labor cost has been cited as the second most important reason for BIP tenants and the most significant factor for tenants in BIP's competitor parks to locate in their respective industrial parks. This result is not unexpected, as Batam serves as a low-cost investment enclave for manufacturing companies, and a large proportion of the BIP tenants and PIE/TIE tenants surveyed engaged in labor-intensive manufacturing activities. This finding is consistent with the location theories surveyed in this paper, which assert that firms view their operations as a value chain and seek to enjoy location-specific advantages associated with establishing part of its operations in the host country/territory.

Constraints on respondents' operations in BIP and competitor parks (Table 2)

The case-study parks are now established industrial-estate developments, but our study alludes to some emerging constraints which have undermined the attractiveness of the parks. These constraints are categorized into three broad groups, namely, those relating to labor, those relating to organization and technology, and those relating to the economic 'environment', such as government policies and regulations.

Labor-related constraints

Industrial relations problems has been cited as the main labor-related constraint faced by BIP tenants (but less so by PIE/TIE tenants), as indicated by the positive and statistically significant β_3 (=3.887). Industrial relations problems were frequently cited as being very disruptive to the operations of the tenants in BIP, as workers unhappy with labor laws often employ pressure tactics such as strikes, demonstrations and work-to-rule. On the other hand, shortages of unskilled/semi labor were found to have affected PIE/TIE tenants to a greater extent than those in BIP, as indicated by the negative and statistically significant β_1 (=-2.417). This finding is not surprising, as the tenants in the competitor parks are largely small and medium-sized enterprises (SMEs), engaged in relatively the low-cost supporting industries, and hence their dependence on unskilled/semi-skilled workers to sustain the viability of their operations. As may be expected, shortages of professionals and managers has been ranked the most common constraint experienced by firms in BIP and the main constraint faced by firms in the competitor parks. This can be attributed to the limited availability of the training institutes/centers in Batam.

Organizational and technology-related constraints

In BIP, the Singapore-styled infrastructure, though reliable and efficient, also proved to be costly, as facilities such as the power plant, waste-treatment system and water supply are independently managed. This constraint is also felt by tenants in the competitor parks, which offered reliable infrastructure at prices only marginally lower than that of BIP. This has resulted in high overhead costs, especially felt by BIP tenants, more so than by non-BIP tenants. This was suggested by the positive and statistically significant β_2 (=3.183). Other organizational/ technological constraints faced by BIP tenants surveyed, but to a lesser extent by PIE/TIE respondents, was the difficulty in obtaining raw materials as indicated by the positive and statistically significant β_4 (=2.835). This may be due to perceptions, and frustrations, over the government's inefficiency in expediting permits necessary for the procurement of raw materials from overseas. The tenant-firms in the competitor parks, given their limited scale of operations, are possibly more nimble in sourcing for alternatives.

`Environmental' constraints

'Impact of host government regulations' was the main constraint faced by both BIP and non-BIP respondents. The government's lack of transparency, coupled with political uncertainties in recent years has resulted in 'constantly shifting legal parameters' that only serve to complicate the operating environment. BIP tenants found this to be a greater concern than PIE/TIE tenants as indicated by the positive and statistically significant β_1 (=2.174), an observation that can plausibly be explained by the type of firms and the nature of operations of the respondents in the case-study parks. The largely foreign-owned firms, with the larger scale of operations operating out of BIP,

would arguably be more perturbed by changes in government regulations and, generally, the host environment, as compared to the street-savvy SMEs in the competitor parks.

DISCUSSION

From our empirical studies, the consensus is that the political climate created by the Singapore and Indonesian governments, the factor conditions and the created infrastructures are the main determinants that shape the synergistic appeal of BIP. On the other hand, firms had invested in PIE/TIE for reasons largely similar to that of BIP investors (although to differing extents), with exception of political commitment from Singapore. In addition, the presence of major buyers proved to be a more important consideration for PIE/TIE tenants than BIP tenants. Tenants in all three survey industrial parks were also able to tap into the low-cost environments of the parks, as well as leverage on Singapore-styled infrastructure (which PIE and TIE had both sought to emulate), management and expertise. These findings lend support to the rationalization theories presented in this paper, and affirm the agglomeration economies suggested by the location theories.

BIP, being the pioneer industrial park in Batam, can also be credited for turning Batam into an attractive low-cost investment location. The subsequent mushrooming of 17 other industrial parks, though not the original strategic intent for commissioning the BIP project, allowed Batam to cater to a wider range of investors, each with varied budgets and operational requirements. Faced with keen competition, each of these parks is forced to constantly improve and innovate as they seek to survive in the competitive environment, in the process, further augmenting the overall appeal of Batam. The resultant influx and clustering of firms within Batam, albeit in different industrial parks, creates a reinforcing process whereby more firms are encouraged to invest in Batam to capitalize on the economies of agglomeration. This represents a step forward towards achieving the (Singapore) government's long-term vision of twinning the contiguous Singapore-Riau economies.

Nonetheless, as most openly admitted, the strategically `engineered', inter-government endorsement of the flagship projects, and the enormous resources mobilized through the strategic partnerships, had failed to shield BIP from a gamut of problems. Issues pertaining to the scale and character of development of BIP are discussed in our earlier papers [13]. Peachey et al [9] have drawn attention to the influx of immigrants to the islands and, concomitantly, to the social problems of squatter settlements which threaten to overwhelm the investment value of the Indonesian parks. The decline of the Salim Group political influence has left BIP's ability to gain privileged access to the central government in doubt, while the decentralization of power to provincial government in recent years has exacerbated the increasingly complex operating environment for foreign firms. The following observations update on recent development and offer new insights on BIP in Indonesia.

Heightened competition

BIP has been facing increasingly strong mounting competition from competing parks within their vicinity. Competitor parks, some of which are backed by prominent Indonesian politicians, have sprouted around BIP. PIE, for instance, is located directly opposite BIP, and offers similar factories at competitive rentals. In fact, PIE has taken BIP's one-stop and self-sufficient environment concept one step further by integrating a shopping complex and executive housing into their industrial park, both with notable success. TIE, which clinched 7 new tenants within 5 months, attributed their success to their ability to differentiate themselves through their emphasis on Total Quality Management approach and relationship building. Latrade Industrial Park, Citra Buana Industrial Park I and II, Citra Nusa Industrial Park and Bintang Industrial Park, cut in at the small-and-medium enterprise segment. Competition among these competitor parks had been nothing less than cut-throat, with many park operators willing to provide massive discounts to entice new tenants. Since 1999, BIP's growth momentum has stagnated, with majority of the new investments into Batam heading towards competitor parks, persuaded by the lure of lower cost and better value for their investment. The premium placed on BIP's formulaic one-stop service, and self-sufficient operating environment, is increasingly called into question.

As well, competition is not limited to within Indonesia. China and India's growing economic importance has increasingly directing foreign direct investments intended for this region into these two countries as firms seek to benefit through closer proximity to these enormous domestic markets. Indonesia's minimum wage level works out

to US$66 per month against Myanmar's US$16 and Bangladesh's US$18 for labor-intensive sectors such as textile, footwear, toys and fashion accessories. Foreign investors have also taken issue over the perceived reluctance of authorities to clamp down on worksite stoppages[2]. Recent press reports on Batam's investor exodus[3] cited sluggish bureaucracy, lack of legal certainty and security, and unclear investment policies as reasons for investors relocating their investments from the province, and Indonesia. Populist measures such as raising the minimum wages before the general elections in 2004, further heighten the reluctance of investors to pour money into the country. Anecdotal evidence, gathered from our on-site interview with the management and tenants of the case-study parks revealed that new investments into Batam are drying up as a result of intense competition from competitor parks in the region (notably China and Vietnam), and compounded by the host of internal problems that radiate from the host environment.

CONCLUDING STATEMENTS

To a large extent, BIP have succeeded in providing the crucial links within the value-added chain that give client firms a competitive advantage. While BIP is now a well-established project, it has not necessarily achieved all its development goals. It has been a springboard for Singapore-Indonesian co-operation in Riau, but it is not yet clear that Singapore has obtained the resource benefits looked for. The problem lies on the flip side of the desired strategic fit – the host country's ability to provide comparative advantages. In both scenarios, the host government has succeeded only in making available the advantages of 'basic factors of production'. Thus, while the case-study parks do provide some components of comparative advantage which the host country does not (e.g. reliable infrastructure), the strategic intent of these cross-border industrial development projects remains stymied by non-economic, socio-political complexities in the larger host environment. Despite retaining certain first mover advantage, BIP must contend with rising competition from the newer industrial developments, both within and beyond Batam, as well as the restricted appeal of its immediate operating conditions.

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TABLE 1
FACTORS INFLUENCING THE RESPONDENTS' DECISIONS TO INVEST IN BIP/NON-BIP PARKS

Variables	Maximum Likelihood Estimates - Binary Logits$_{\psi}$		Popular Ranking			
			BIP		PIE/Tunas	
	α_{ι}	p-value$_{\phi}$	Frequency	Rank	Frequency	Rank
Political commitment from Singapore Government	3.851	0.026 **	15	5	0	7
Stable Government	2.135	0.110	17	4	8	2
Competitive Overheads	6.754	0.006 ***	20	2	8	2
Reliable Infrastructure	5.019	0.007 ***	21	1	8	2
Competitive Labor Cost	-1.863	0.299	20	2	11	1
Presence of Major Buyers	-1.588	0.300	15	5	8	2
Access to Domestic Market	1.706	0.351	5	7	3	6
Constant	-8.828	0.004 ***				

TABLE 2
CONSTRAINTS ON THE RESPONDENTS' OPERATIONS IN BIP/NON-BIP PARKS

Variables	Maximum Likelihood Estimates - Binary Logits$_{\psi}$		Popular Ranking			
			BIP		Non-BIP parks	
	α_{ι}	p-value$_{\phi}$	Frequency	Rank	Frequency	Rank

Labor Constraint						
Shortage of semi/unskilled labor	-2.417	0.087 *	1	4	6	2
Shortage of professionals and managers	1.303	0.181	10	2	8	1
Industrial Relation Problem	3.887	0.004 ***	15	1	1	3
Others	1.163	0.452	4	3	1	3
Constant	-1.055	0.199				
Organizational/Technological Constraints						
Difficulty in obtaining capital equipment	-0.344	0.694	5	3	8	2
Difficulty in obtaining raw material	3.183	0.007 ***	16	2	5	3
Difficulty in securing funds for expansion	0.914	0.375	4	4	3	4
High overheads	2.835	0.017 **	18	1	9	1
Constant	-3.303	0.016 **	0	5	1	5
Environmental Constraints						
Impact on Government Regulation	2.174	0.006 ***	22	1	8	1
Reduced Involvement from Singapore Government	-0.405	0.781	1	2	2	2
Constant	-1.147	0.094 *				

Note:
ψ Estimated values were taken from "forced entry" regression.
ϕ p-values are for 2-tailed tests.
* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

Source: Questionnaire surveys.